both by Principal Forbes and Sir William Thomson, the author applies himself solely to trace the existence of other cycles than the ordinary annual one, in the rise and fall of the different thermometers.

Of such cycles, and of more than one year's duration, he considers that he has discovered three; and of these the most marked has a period of 11·1 years, or practically the same as Schwabe's numbers for new groups of solar spots. Several numerical circumstances, however, which the author details, show that the sun-spots cannot be the actual cause of the observed waves of terrestrial temperature, and he suggests what may be, concluding with two examples of the practical use to which a knowledge of the temperature cycles as observed may at once be turned, no matter to what cosmical origin their existence may be owing.

II. "On the Constituent Minerals of the Granites of Scotland, as compared with those of Donegal." By the Rev. SAMUEL HAUGHTON, F.R.S., M.D. Dubl., D.C.L. Oxon., Fellow of Trinity College, Dublin. Received March 31, 1870.

During the past summer (1869) I completed my investigation of the constituent minerals of the Scotch Granites, and secured specimens, from the analysis of which I obtained the following results:—

I. *Orthoclase.*

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	65·40	64·44	64·48	64·48
Alumina	19·04	18·64	20·00	20·00
Peroxide of iron	trace.	0·80	none.	none.
Lime	0·22	0·66	1·01	0·78
Magnesia	trace.	trace.	trace.	none.
Soda	3·63	2·73	1·72	2·19
Potash	11·26	12·15	12·81	12·10
Water	0·20	0·80	0·64	0·08
	99·75	100·22	100·66	99·63

No. 1. Stirling Hill, Peterhead. Occurs in an eruptive Granite, in veins, in well-developed reddish-pink opaque crystals, encrusted with crystals of Albite.

No. 2. Rubislaw, Aberdeen. Large beautiful reddish-pink opaque crystals in veins, associated with white Mica. The Granite of Rubislaw is of metamorphic origin, and different in character from the eruptive Granite of Peterhead. No Albite has been found in it.

No. 3. Peterculter, Aberdeen. In metamorphic Granite; white, translucent, large crystals.

No. 4. Callernish, extreme west of Lewis. In metamorphic Granite; in large grey crystals, with a slight shade of pink, translucent.

The oxygen ratio of these felspars is as follows:—

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	33·956	33·456	33·478	33·477
Alumina &c. ..	8·898	8·950	9·348	9·348
Lime	0·061	0·187	0·286	0·221
Soda	0·929	0·699	0·440	0·561
Potash	1·908	2·059	2·171	2·051
	45·752	45·351	45·723	45·658

From this Table we find the oxygen ratios:—

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	11·37	11·35	11·55	11·82
Peroxides.....	3·06	3·04	3·22	3·30
Protoxides	1·00	1·00	1·00	1·00

The Granites of central and western Scotland are metamorphic rocks, like those of Donegal and Norway, with which they are geologically identical; and truly eruptive Granite occurs at only a few localities, as, for example, near Peterhead.

The second felspar associated with Orthoclase in the Metamorphic Granites is Oligoclase, as in Donegal; while the second felspar associated with Orthoclase in the eruptive Granites is Albite, as in Mourne, Leinster, and Cornwall. The fact thus indicated by the Scotch Granites is completely in accordance with the mode of occurrence of Oligoclase and Albite in the Irish Granites.

II. *Oligoclase.*

	No. 1.	No. 2.
Silica.....	62·00	61·88
Alumina	23·20	24·80
Magnesia	——	Trace.
Lime.....	4·71	4·93
Soda.....	9·20	8·12
Potash	0·43	0·98
	99·54	100·71

No. 1. This Oligoclase occurs in the Granite of Craigie-Buckler, near Aberdeen; it is white and opaque, and so much resembles Cleavelandite in appearance as to have been mistaken for that variety of Albite; its analysis proves it to be Oligoclase. The crystals do not exhibit striation.

No. 2. From the Granite of Rhiconich, in the west of Sutherlandshire;

it is greyish white, semitranslucent, in large striated crystals, and resembles the Oligoclase of Ytterby, in Sweden.

The oxygen ratios of the Oligoclase are as follow:—

	No. 1.	No. 2.
Silica	32·191	32·128
Alumina	10·843	11·590
Lime	1·339	1·400
Soda	2·360	2·082
Potash	0·072	0·165
	46·805	47·365

Hence we obtain:—

	No. 1.	No. 2.
Silica	8·54	8·82
Peroxides	2·88	3·18
Protoxides	1·00	1·00

These oxygen ratios prove the felspars to be Oligoclase.

III. *Albite.*

Silica	68·00
Alumina	20·00
Lime	0·35
Magnesia	trace.
Soda	10·88
Potash	0·68
	99·91

This Albite occurs at Stirling Hill, near Peterhead, in eruptive Granite, and is found associated with red Orthoclase in veins; it encrusts the large crystals of Orthoclase, and is semitranslucent, and is generally stained on the surface by peroxide of iron.

Oxygen Ratios.

Silica	35·306		11·77
Alumina	9·348		3·11
Lime	0·099		
Soda	2·790		1·00
Potash	0·114		

This mineral is evidently a typical Albite.

There are two kinds of Mica found in the Scotch Granites, and both Micas resemble very closely the corresponding minerals of the Donegal Granites.

IV. *White Mica.*

Silica	44·40
Fluosilicon (SiF_3)	0·16
Alumina	37·36
Peroxide of iron	2·04
Lime	0·78
Magnesia	0·57
Soda	0·93
Potash	9·87
Protoxide of manganese	0·24
Water	1·84
	98·19

The specimen of Mica here analyzed came from veins in the Granite quarry of Rubislaw, near Aberdeen, and occurs in large plates, associated with red Orthoclase. It was carefully examined for lithia, but no trace of this alkali could be found in it.

The angles of the rhombic plates were 60° and 120° exactly, and the angle between its optic axes was found to be 72° 30′.

The black Mica in large crystals is very rare, but it seems abundantly disseminated in minute scales through most of the Scotch Granites. The following analysis was made on specimens found near Aberdeen by Prof. Nicol, and kindly forwarded to me by him, for the purposes of this paper:—

V. *Black Mica.*

Silica	36·50
Alumina	16·50
Peroxide of iron	18·49
Lime	1·11
Magnesia	7·44
Soda	0·92
Potash	8·77
Protoxide of iron	6·76
Protoxide of manganese	1·80
Water	1·60
	99·89

This mica was carefully examined for fluorine, and found not to contain any.